

## 4.0 LIGHT INDUSTRY, MANUFACTURING & CONSUMER PRODUCTS

Manufacturing and light industry includes a wide variety of businesses that are involved in the manufacture and distribution of goods and services. These may include textiles, clothing, food and drink, vehicles, paper products, domestic and industrial goods, toys, computer hardware and software, laundry services, auto assembly, and so on. It does not include businesses that deal with production of raw materials (e.g., mining, power production, logging), nor does it include agriculture. Because of the wide range of types of businesses, there are many potential ways in which improper business practices could affect drinking water.

Depending on the types of activities each business conducts, potential sources of pollutants from such industries may include solvents, metals, organic contaminants such as petroleum products, salts, acids, strong alkaline bases, dyes, detergents, nutrients, bacteria and viruses, and sediment.

### 4.1 Best Management Practices

Individual pollution prevention measures may not be adequate to prevent contamination of drinking water source waters. Measures should be combined in an overall pollution prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the drinking water source waters, the public's acceptance of the measures, and the community's desired degree of risk reduction. To protect drinking water to the greatest extent possible, a wide variety of Manufacturing and Light Industries can use the following BMPs as well as the additional referenced resources contained in Section 6 of this booklet.

- ***Training Your Employees and Yourself.*** Less waste will result in a safer and more cost-effective business. Employees should be educated about the benefits of preventing pollution; know about Material Safety Data Sheets (MSDSs); and be re-trained periodically to keep good practices in mind and to be informed of new regulatory requirements.
- ***Keeping Good Records.*** It is important to keep good records in order to track pollution prevention efforts and the other benefits of using BMPs. Facility plans and permits should be regularly updated. Supply inventory, waste disposal, and recycling records should be maintained to track materials used and savings linked to reduction of wastes and progress of efforts to prevent pollution.
- ***Effective Communication.*** This BMP involves reminding employees about pollution prevention, spill avoidance and control procedures, and emergency response information through the effective use of signs, posters, and other techniques. Stenciled warning signs should be posted for customers and employees instructing them not to dump vehicle fluids, pesticides, solvents, fertilizers, organic chemicals, or toxic chemicals into catch basins.

- **Identifying Priority Non-Point Source Pollutants.** This practice involves targeting and implementing strategies for mitigating the effects of non-point source (NPS) pollutants identified for your business.
- **Wash Areas.** This BMP consists of a designated wash system or area that should be located on well-constructed and maintained, impervious surfaces (i.e., concrete or plastic) with drainage piped to the sanitary sewer or other appropriate disposal devices such as biological treatment systems.
- **Proper Management of Wastewater.** This management measure involves choosing an approach appropriate for the size of the site, resources available, and the nature of the wastewater. Typical BMPs include:
  - Oil/water separators – self contained structural practices designed to isolate and contain oil and other floatables;
  - Collection sumps – storage areas designed to isolate and capture settleable pollutants;
  - Sediment traps – similar to collection traps but specifically designed for sediment collection;
  - Recycling systems – capture and reuse of wastewater for multiple purposes; and
  - Grassed swales and constructed wetlands – constructed practices designed to capture and treat wastewater and stormwater runoff.
- **Managing Surface Water Runoff Facilities.** This BMP involves properly operating, maintaining, and monitoring facilities. Where possible, modify existing drainage or conveyance structures to improve water quality. In the case of a spill of oil or hazardous materials, emergency response equipment should be maintained to minimize impacts to catch basins.



**Examples of methods to prevent storm sewer infiltration**  
 (Source: [www.labsafety.com](http://www.labsafety.com))

- **Identifying Green Space Goals.** This program involves the promotion of activities such as tree plantings and pavement reclamation projects and the preservation of areas of pervious lands.
- **Retrofit Opportunities.** This approach for pollution prevention includes the assessment and implementation of a wide variety of management practices to improve water quality and existing drainage conditions.
- **Policies for Onsite Disposal Systems (OSDS) Management.** These programs involve ensuring that new sewage disposal systems are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to surface and ground waters; and properly operating, maintaining, inspecting, and replacing or upgrading existing OSDS.
- **Evaluating Use Of Hazardous Materials.** This management strategy involves the proper use and disposal of a wide variety of hazardous materials and includes:
  - Discontinuing, minimizing and or optimizing, recovering, recycling, reusing, or substituting the use of hazardous agents in the workplace where possible;
  - Developing a good waste reduction and management strategy;
  - Responsible purchasing; and
  - Conducting waste exchanges.
- **A Chemical Management Plan.** This strategy should be implemented for vehicle washes and other chemical applications that use metal brighteners, caustics or acids, chlorinated hydrocarbons, or solvents. The plan should include a list of the chemicals used, the method of disposal such as reclamation or contract hauling, and procedures for assuring that toxic chemicals are not discharged into source water.
- **Proper Use, Storage, Handling and Disposal of Chemicals.** This approach involves the proper use, handling, and disposal of a wide variety of chemicals and includes:
  - Reading the label;
  - Employee training;
  - Spill prevention cleanup procedures;
  - Appropriated disposal of pesticide and other chemical containers;
  - Conducting chemical audits – inventories of chemicals maintained on-site;
  - Developing chemical management plans;
  - Proper on-site storage of hazardous substances;
  - Emphasizing that hazardous waste should never be discharged into floor drains, storm drains, toilets, sinks, other improper disposal areas, or other routes leading to public sewers, septic systems, or dry wells; and
  - Developing spill prevention, control, and response plans.

- ***Prevention Measures For Small-Scale Pesticide Application.*** This series of practices is oriented toward the proper application and management of every-day pesticides for small-scale operators. Typical management strategies involve:
  - Applying Integrated Pest Management (IPM) Strategies;
  - Utilizing non-chemical control measures and alternate plants/pest-resistant varieties;
  - Proper application and regular monitoring;
  - Applying biological controls; and
  - Use of low persistence pesticides.
  
- ***Reduce Pesticide Use.*** This management approach strives to reduce the net amount of pesticides applied at a given site to maintain landscaping or other on-site vegetations. Some typical measures include:
  - Selecting healthy seeds and seedlings;
  - Alternating annual plantings;
  - Including manual activities such as spading, hoeing, mulching, etc.;
  - Conducting plant management; and
  - Using biological controls.



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## **4.2 Case Study: Consumer Products- Anheuser-Busch, Inc. Brewery, Merrimack, NH**

### **a) Background**

The Merrimack River serves as a major source of drinking water in New Hampshire and Massachusetts. Located on 300 acres on the west bank of the Merrimack River, the Anheuser-Busch, Inc. Merrimack Brewery, a consumer products company, operates 24 hours a day, seven days a week. Anheuser-Busch's operations and resources at this facility include beer brewing, bottling, packaging, shipping, steam production, and raw material receiving. Production personnel and security officers manage the facility continuously.

Stormwater management at the Anheuser-Busch site is regulated by the Site Specific or Alteration of Terrain program administered by the New Hampshire Department of Environmental Services (NHDES), which oversees all large earth disturbances, specifically, erosion control and post-development stormwater management. The stormwater management program at the brewery goes beyond NHDES and federal regulations to provide superior drinking water protection. By preventing pollution from occurring, Anheuser-Busch works to maintain or improve the current water quality of the Merrimack River. This reduces the cost of treatment to downstream communities and increases public health safety.



**Anheuser-Busch Inc.'s Merrimack Brewery –  
A major consumer products company serving New England.**

Anheuser-Busch works to protect water quality in the Merrimack River by preventing non-stormwater discharges, such as chemical spills, from reaching the river through the stormwater drainage system. Best Management Practices (BMPs) that have been implemented at the brewery to separate stormwater and non-stormwater sources include the development of a comprehensive Stormwater Pollution Prevention Plan, implementation of structural designs such as color-coded sewer drain covers, secondary containment technologies such as berms, troughs, and a Dry Weather Flow Pumpback System, and non-structural solutions that include contractor and employee training, facility inspections, spill prevention and response strategies, and an emergency response team that is available on-site during all shifts.

**b) Management Measures Applied at the Merrimack Brewery**

***BMP: Development of a Comprehensive Stormwater Pollution Prevention Plan***

**Evaluation Question: Does your facility have a formal plan to prevent contamination of stormwater by non-stormwater pollution sources?**

**Performance:** Stormwater systems are not designed to handle or treat inputs from sources other than precipitation runoff, such as chemical spills, soil erosion from construction activities, or sewage. If these substances enter a stormwater drainage system that empties into a surface water body or a ground water aquifer, they could end up eventually contaminating the drinking water supply. The Anheuser-Busch, Inc. Merrimack Brewery has implemented a comprehensive Stormwater Pollution Prevention Plan that evaluates potential sources of stormwater contamination, describes existing stormwater management and pollution prevention practices, identifies potential non-stormwater discharges to stormwater sewer lines, and provides recommendations for changes to current stormwater management practices or structures to prevent future pollution of stormwater.

***BMP: Installation of Color-Coded Sewer Drain Covers***

**Evaluation Question: Does your facility have separate pipelines for stormwater and non-stormwater (e.g., process waste) discharges?**

**Evaluation Question: If so, have you color-coded or otherwise made a distinction between the drain covers to the systems for easy identification?**

**Performance:** The Anheuser-Busch, Inc. Merrimack Brewery has two separate sewer systems. One exclusively handles stormwater flows, while the other contains process/sanitary wastewater. The stormwater sewer pipe eventually empties into the Merrimack River. The process wastewater sewer system transfers process and sanitary wastewater to the Town of Merrimack Waste Water Treatment Facility. Outside stormwater sewer drain covers have been painted bright orange, while process sewer drain covers have been painted bright green. All employees have been instructed to prevent any non-stormwater discharges from entering the orange drains.





**Installation of Color Coded Sewer Drain Covers – All storm sewer and process sewer covers and drains are marked. Stormwater systems are marked orange while process sewers are marked bright green. Given the large area of the facility this color coding can be useful in responding to spills or cleanups.**

***BMP: Utilization of Secondary Containment Technologies such as Berms and Basins***

**Evaluation Question: Does your facility provide structural measures to contain accidental spills?**

**Performance:** Berms border all outdoor chemical storage and loading/unloading areas at the Anheuser-Busch, Inc. Merrimack Brewery to isolate these areas from the stormwater sewer system. In the event of an accidental spill in one of these areas, the material is contained in a localized area by the berm, simplifying the cleanup process and ensuring that prohibited contaminants are not released into the stormwater sewer system and subsequently to the Merrimack River

***BMP: Dry Weather Flow Pumpback System***

**Evaluation Question: Is your facility able to intercept non-stormwater discharges that may enter the stormwater discharge system?**

**Performance:** At the very end of the Anheuser-Busch, Inc. Merrimack Brewery storm sewer system, an automated Dry Weather Flow Pumpback (DWFP) system has been installed. This system is a final “safety net” that can catch and store any non-storm flows that might accidentally enter the storm sewer system. Materials that are caught by the DWFP system can

either be pumped directly to the process sewer system or into a tank truck, or otherwise contained and treated. There are several features to the system, including a 2,000-gallon capacity intercept pit, two pumps that can each pump at least 75 gallons per minute, level control instrumentation, a motorized slide gate that can be operated manually or automatically, a rain gauge, programmable logic control for local and remote automatic control, and full integration with the brewery's remote monitoring system. The slide gate is normally closed to prevent any non-storm flows from reaching the Merrimack River. During rain or melting snow events, the gate may be opened to allow the flow of stormwater.

***BMP: Provide Instructional Materials to Contractors and Employees and Conduct Regular Inspections of Stormwater Management System Infrastructure***

**Evaluation Question: Does your facility provide information to contractors and employees about your stormwater management program?**

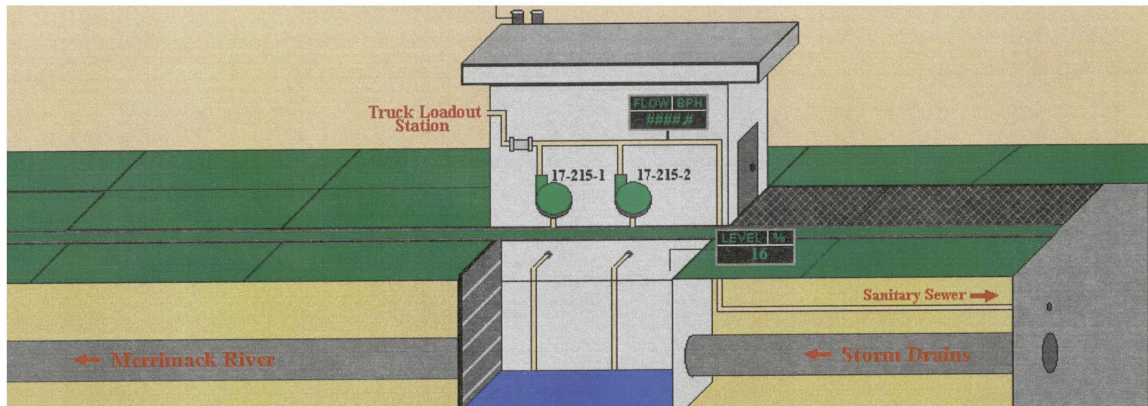
**Evaluation Question: Does your facility train its employees about the proper use and maintenance of its stormwater system?**



**Any hazardous materials at the site have required secondary containment structures such as berms and detention basins**



## Anheuser-Busch Inc - Dry Weather Pumpback System



**Anheuser-Busch, Inc. – Dry Weather Flow Pumpback System Schematic:** Stormwater discharges are directed to this dry weather flow pumpback system. System contains emergency pump-out feature for spills and a 2,000-gallon intercept basin. Fluids can be pumped back to process sewer to tank truck or contained and treated. The intercept basin is monitored through central process operations at the facility.

**Evaluation Question:** Does your facility perform regular inspections of stormwater drains, pipelines, containment structures, and other components of its stormwater management system?

**Performance:** Anheuser-Busch talks to contractors and employees about the importance of following the brewery's stormwater management program. For example, employees participate in the protection of drinking water quality by preventing non-stormwater discharges from entering the stormwater sewer system through the orange drain covers mentioned above. Also, stormwater catch basins and oil/water separators are cleaned regularly to prevent potential pollutants from entering the storm sewer system and ultimately the Merrimack River.

### ***BMP: Spill Prevention Strategies and Emergency Response Plans***

**Evaluation Question:** Does your facility have a plan to prevent and respond to any chemical or hazardous material spills?

**Evaluation Question:** Does your facility have a plan for responding to a chemical or hazardous material spill ?

**Performance:** Well-defined, designated material loading/unloading areas and material storage areas that are equipped to handle potential spills are a key part of Anheuser-Busch's plan to prevent drinking water contamination. By restricting material transfers and storage to areas that are both prepared for spills and isolated from the stormwater sewer line (which discharges to the Merrimack River), , Anheuser-Busch can manage an unexpected spill without impacting the river. An on-site emergency response team (a HAZWOPER team) is also available on every shift. Team members receive refresher training at least annually, and wear 2-way radios or pagers so that they can be immediately notified of an emergency.

### **c) Conclusions**

Anheuser-Busch's stormwater management program is a work in progress. The company works cooperatively with Pennichuck Water Works, the water supplier for the brewery and several nearby towns in New Hampshire, to improve its stormwater management and to offer input on drinking water protection measures and water quality standards. The stormwater controls, containment, and management plan outlined by the Anheuser-Busch, Inc. Merrimack Brewery all work to avoid impairment of water quality in the Merrimack River. As a result, improved water quality in the river results in financial savings to downstream communities that are able to avoid costly water treatment measures.

### **d) Additional Resources**

#### **Anheuser-Busch Companies, Inc.**

One Busch Place  
St. Louis, MO 63118  
Phone: (800) 342-5283  
E-mail: [contactus@anheuser-busch.com](mailto:contactus@anheuser-busch.com)

#### **Pennichuck Water Works**

4 Water Street  
Nashua, NH 03060  
Phone: (603) 882-5191  
Email: [www.pennichuck.com/](http://www.pennichuck.com/)

#### **Town of Merrimack**

Dean E. Shankle, Jr., Ph.D., Town Manager  
P.O. Box 940  
Merrimack, NH 03054-0940  
Phone: (603) 424-2331  
Email (Town Manager): [dshankle@ci.Merrimack.nh.us](mailto:dshankle@ci.Merrimack.nh.us)

#### **New Hampshire Department of Environmental Services**

Stormwater and Drinking Water Source Protection Programs  
6 Hazen Drive  
P.O. Box 95  
Concord, NH 03302-0095  
Phone: (603) 271-3503

NH DES website: [www.des.state.nh.us](http://www.des.state.nh.us)

NH DES Drinking Water Source Protection Program: [www.des.state.nh.us/dwspp/](http://www.des.state.nh.us/dwspp/)

### **4.3 Business Self-Evaluation For Light Industry, Manufacturing & Consumer Products**

The Self-Evaluation questions below are designed to help you evaluate whether your manufacturing or light industry business is doing the most it can to protect drinking water. Questions are grouped by issue.

#### **Do You Know Your Source of Drinking Water?**

Do you know the name and location of your source of drinking water? Yes \_\_\_ No \_\_\_

Do you know whether this is a public or private drinking water source? Yes \_\_\_ No \_\_\_

Do you know the type of drinking water source (e.g., is it a well that draws on ground water, or is it a surface water source such as a reservoir, lake, river or stream)? Yes \_\_\_ No \_\_\_

What is the distance from your business to the drinking water supply? \_\_\_ ft. or miles

What is the distance from your business to any tributary stream or river? \_\_\_ ft. or miles

What is the distance from your business to any Wellhead Protection Area? \_\_\_ ft. or miles

#### **Water Quality and Prevention of Pollution**

Do you know of any water quality concerns for your public drinking water supply? Yes \_\_\_ No \_\_\_

Does your facility treat for any washwater, non-human sewage, wastewater, or stormwater to improve water quality conditions? Yes \_\_\_ No \_\_\_

#### **Have You Had Contact with Your Water Supplier?**

Have you ever contacted your local drinking water supplier about your business's potential to affect the water supply? Yes \_\_\_ No \_\_\_

#### **Have You Had Contact with Your State Source Water Assessment Program?**

Has your state Source Water Assessment water supplier contacted your business about your facility's potential to affect a water supply? Yes \_\_\_ No \_\_\_

#### **Do You Know The Contaminant Characteristics of Materials You Are Working With?**

Toxic characteristics of a material means the ability of a material to cause toxic or other adverse reactions in humans or other living organisms. Descriptions of toxicity or precautions to take when handling these materials can be found on the product packaging or with materials that are provided by the supplier and/or the manufacturer. Do you know the toxic characteristics of the materials your business uses? Yes \_\_\_ No \_\_\_

Are Materials Data Safety Sheets (MSDSs) provided for all the hazardous materials kept on the property (the federal Occupational Safety and Health Administration, or OSHA, requires that these be kept and made available to employees)? Yes \_\_\_ No \_\_\_

### **Minimize Waste in Order to Minimize Pollution**

One of the most effective ways to prevent pollution is to reduce the amount of liquid or solid waste that a business generates. Reducing the amount of waste generated means that there is less waste to dispose of. Less disposal of waste generally translates into less pollution at the waste disposal site, and therefore less of a possibility for polluting ground water, surface water and drinking water supplies. Whether the waste is paper, metals, petroleum products, chemicals, inert materials, soil, or other materials, minimizing waste is always a good idea.

Does your business minimize the amount of waste produced? Yes \_\_\_ No \_\_\_

Do you avoid hosing down work areas, which results in contaminating large amounts of water that must then be properly disposed of? Yes \_\_\_ No \_\_\_

If your business requires the use of water to wash or dilute materials that contain metals, pesticides, oil or grease, petroleum products, bacteria or other microorganisms, food processing wastes, soil, animal or human wastes, fertilizers, pesticides, disinfectants, salt, deicing chemicals, paints (whether water or oil-based), do you minimize the amount of water used and do you capture the wash water or send it to an approved treatment system?  
Yes \_\_\_ No \_\_\_

Does your business practice recycling? Yes \_\_\_ No \_\_\_

### **Good Housekeeping**

Are all hazardous materials stored in a safe manner, as specified in the instructions on the product packaging? Yes \_\_\_ No \_\_\_

Is the floor kept clean and dry to prevent buildup of contaminants and dirt, and are the sweepings properly disposed? Yes \_\_\_ No \_\_\_

Are there safety receptacles for disposal of cleaning rags, dust and other materials, and are these properly disposed? Yes \_\_\_ No \_\_\_

Are all hazardous materials stored in a manner that prevents spillage and prevents rain or snow from falling on them, and are they clearly labeled? Yes \_\_\_ No \_\_\_

Do you attempt to substitute non-toxic materials where available to meet your needs?  
Yes \_\_\_ No \_\_\_

## **Inspections and Safety Checks**

Are regular inspections, safety checks and monitoring of conditions carried out and the results written down in a logbook or other means of permanent documentation? Yes \_\_\_\_ No \_\_\_\_

## **Keeping Good Records**

Are good, accurate records kept of all hazardous materials; that includes the date bought, time stored, date used, and their expiration date, if any? Yes \_\_\_\_ No \_\_\_\_

Are good, accurate records kept concerning disposal or recycling of materials, which describe who, what, when, why and where the material was disposed? Yes \_\_\_\_ No \_\_\_\_

## **Training Your Employees and Yourself**

Are all employees, including you, trained in ways of preventing pollution and spillage, safe and legal disposal methods, reporting of spills, quickly and effectively communicating problems to management, and in worker safety and public health? Yes \_\_\_\_ No \_\_\_\_

Is such training done on a regular basis? Yes \_\_\_\_ No \_\_\_\_

## **Unintentional Activities**

Are there any staff or customer activities that could unintentionally cause pollution or a spill to occur? Examples in the light industry could include accidental spillage of fuel or other hazardous materials, or not following proper Best Management Practices (BMPs) to prevent pollution. Yes \_\_\_\_ No \_\_\_\_

## **Other Physical, Structural, and Managerial Practices to Minimize Pollution and Spills**

Are floor drains connected to holding tanks and are tanks in good condition (e.g., not leaking)? Yes \_\_\_\_ No \_\_\_\_

Are spills prevented from ever reaching the floor? Yes \_\_\_\_ No \_\_\_\_

Do you have a plan that shows all floor drains, pipes, cleanup equipment, areas for storage of hazardous materials, fire safety and control equipment, and waste disposal bins? Yes \_\_\_\_ No \_\_\_\_

Are job responsibilities clearly defined so that specific individuals are responsible for ensuring that pollution prevention measures are carried out? Yes \_\_\_\_ No \_\_\_\_



## Emergency Plans

Do you have a spill or cleanup plan already developed, and are all staff, including yourself, trained to conduct such an emergency spill or cleanup plan immediately? Are all the materials required for such a spill or cleanup available and in good condition? Yes\_\_\_ No \_\_\_

### Self Assessment

If you have answered yes to most or all of the questions above, congratulations! You are probably running your business in a manner that helps to protect our drinking water resources. If you answered no to many or most of the questions or you wish to find out more about protecting drinking water, please examine the BMPs and the Case Studies in this Section. These describe specific BMPs that can be applied, and the Case Study give an example of a business that has applied BMPs to protect drinking water.